RESEARCH CONCERNING APARENT KNOTS DISTRIBUTION IN QUALITY ZONES OF OAK TREES FROM BOBOSTEA FOREST (BIHOR COUNTY)

Bartha Szilard*

*University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048 Oradea, Romania, e-mail: szilardbartha@yahoo.com

Abstract

The work presents the results of observations performed at the Turkey oak species, in test surfaces placed in Bobostea forest (Bihor county) and not only (Tasnad Forest District and Dumbrava-Beliu Forest District), which allowed certain conclusions related to the distribution of this defect of the quality zones and its distribution on the biological origins of trees.

Key words: defects of wood, uncovered knots, biological origins

INTRODUCTION

The defects of wood have as object the deviations from the regular state regarding the shape of the trunk, structure, integrity of tissues, its chemical composition, but also some structure formations (nodes, heart), deviations which negatively influence the quality and restrain the possibilities of use in certain fields. Also, it answers to the need of profound knowledge of quality, making available descriptions of possible deviations, resulted from a long previous experience (Beldeanu, 1999, 2008).

Nodes are part of the branches of trees which are embedded in the wood, due to the increase in thickness of the trunk (fig. 1); their presence is related to the existence of branches, they are inevitable wood defects (Beldeanu, 2008).

In the European standard EN 1316 (where are presented the legal restriction imposed to oak nodes), nodes are analyzed according to their degree of health, size and frequency. Nodes, except the small ones,, grouped, can increase aesthetic qualities, but generally is one of the causes of wood quality depreciation (Beldeanu, 2008).

According to J. Filipovici (1964), knotty woods are not indicated to the products based on splitted wood: .dowels, ribbs etc; knotted wood is not recommended for staves manufactury, because it allows fluids to pass through.

Fig. 1 The presence of apparent nodes on a oak tree derived from seed (u.a. 87D, U.P. VII Boboştea)

MATERIAL AND METHOD

For the purpose to characterize from a qualitative point of view the wood of the Turkey oak trees, within the researched perimeter (Bobostea forest) was placed a number of 14 test surfaces, of variable size (2000-2400 m^2), where measurements and observations were performed at a number of 613 copies of Turkey oak trees. For comparisons, two more test surfaces were placed on Tăşnad Forest District (Satu Mare county), having the size 2000 m^2, where a number of 51 Turkey oak tree exhibits were measured and observed, respectively two test surfaces at Dumbrava-Beliu Forest District (Arad county), with the size 2000 m^2, where, also, a number of 78 Turkey oak tree exhibits were measured and observed. The total number of copies of Turkey oak tree exhibits measured in the 18 test surfaces was of 742 (see table 1).

The placement of test markets was performed with the help of electronic hypsometer (Vertex IV), in order to determine the inclination and extreme length of the side placed on the largest slope of direction. The test markets have a rectangular shape of 2000-2400 m^2, in relation to the homogeneity in which concerns the station conditions, of coppice and the number of component trees (minimum 30 analyzed trees/test surface), (Dinulică, 2008). The exception is represented by the test surface placed in the 72C subcompartment (Tăşnad Forest District, V Supur Management Unit), in which, due to the forest-technical interventions, the number of remaining trees was smaller (21 exhibits/ test surface).

Table 1

The Turkey oak tree samples taken from the assessed stand

No.	Forest District/ Management Unit	Subcompartmen	Station type	Forrest type	Consistency	Age (years)	Area (m^2)	Assessed standing timber
1	1	**3D**	6143	7432	0.9	70	2200	30
2	1	**5A**	6143	7432	0.9	70	2000	47
3	1	**6C**	6143	7432	0.8	70	2000	45
4	1	**8D**	6143	7432	0.8	80	2000	43
5	1	**34B**	6142	7411	0.8	75	2000	46
6	1	**55C**	6153	7513	0.6	100	2400	30
7	1	**69B**	6143	7432	0.8	75	2000	50
8	1	**77B**	6143	7432	0.8	100	2000	46
9	1	**83A**	6143	7432	0.8	105	2000	58
10	1	**87A**	6143	7432	0.7	100	2000	46
11	1	**87C**	6143	7432	0.8	90	2000	44
12	1	**87D**	6143	7432	0.6	90	2200	30
13	2	**124A**	8321	7421	0.8	85	2000	51
14	2	**128A**	8321	7421	0.8	80	2000	47
15	3	**9A**	6143	7111	0.8	85	2000	40
16	3	**16B**	6142	7112	0.7	135	2000	38
17	4	**62A**	6143	7412	0.7	130	2000	30
18	4	**72C**	6143	7412	0.5	120	2000	21
Grand total		**-**					**36800**	**742**

Remark for Forest district/Management Unit: 1-Sfănta Maria Forest District/VII Boboştea Management Unit; 2-Oradea Forest District /VIII Mihiş Management Unit; 3-Dumbrava Forest District /I Beliu Management Unit; 4-Tăşnad Forest District/V Supur Management Unit;

Starting from the sorting system (dimensional and qualitative) of oak raw wood according to European standards (Balleux, 2004), in the case of Turkey oaks (*Quercus cerris*) samples surveyed we also defined three quality areas on the trunk height, as follows: the 1st quality area includes the first 6m of trunk height, 2nd quality class ranges from 6m up to the tree crown, and the 3rd quality contains the trees' crown. Due to the incidence of quality defects on both quality areas (1st quality area I and 2nd quality area), we defined an intermediate area.

The office works were represented by the processing and interpretation of data gathered from the field, these were centralized on biological origins and categories of diameters. The elaboration of charts was performed with the help of Microsoft Excel program.

RESULTS AND DISCUSSIONS

From observations on analyzed tree, it was found that 66% of the trees have no visible knots. According to figure 2 - Quality zone I is 2.7% affected, the second 0.3%, while the I and II (intermediate zone), more than

30%, mainly visible on the II quality. The data obtained shows that this defect affects simultaneously at a rather high rate, the I and zone II. It is important to note that the quality I have the highest percentage of working wood, is affected in the lowest proportion - 2.7%, which makes suitable for valuable wood sorts.

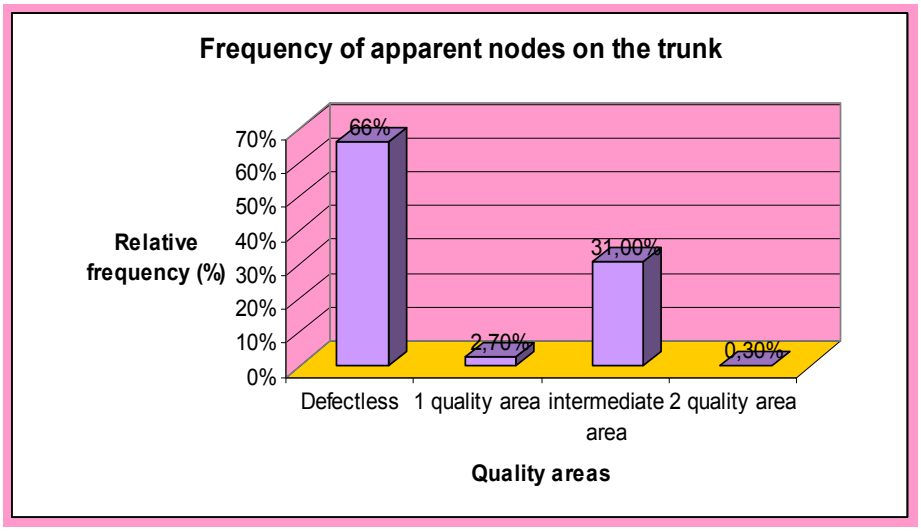

Fig. 2 Frequency of apparent nodes on the trunk and quality areas

Regarding biological origins, trees come from seeds without this defect and expressed in percentage is 76%, while the trees are coming from shoots without defect are in a ratio of 59%, the differences between biological origins is very significant (table 2).

Table 2

The Statistics Significance of the biological provenience regarding the uncovered knots localization on the trees height

The result of the test Kruskal-Wallis: H=23.10836***, N = 742 trees, f = 1 degree of liberty, p<0.1%		
The matrix of probabilities of transgression of individual variations caused by the biological origin of trees		
	Origin of seed	**Origin of sprout**
Origin of seed		0.000072
Origin of sprout	0.000072	

CONCLUSIONS

● From observations on analyzed trees, it was found that 66% of the trees have no visible knots.

● The quality zone I is affected at a rate of 2.7%, the second by 0.3%, while the I and II (intermediate zone), more than 30%, mainly visible on the II quality.

● The trees come from seeds without this defect and expressed in percentage is 76%, while trees coming from shoots without defect are in a ratio of 59%.

● Nonparametric Kruskal-Wallis test results show us that the differences between the two biological origins are very significant (p <0.1%).

In conclusion, one can affirm that the quality zone I with the highest percentage of working wood, is affected in the lowest proportion-2.7%, which makes suitable timber (in this regard) for valuable sorts.

REFERENCES

1. Bartha Sz., 2011: *Cercetări privind factorii de variație a calității lemnului de cer din pădurea Boboştea (Jud. Bihor)*. Teză de doctorat, Universitatea Transilvania Braşov.

2. Balleux. P., 2004: *Les débouchés du chêne*. Silva Belgica 6, I-VI.

3. Beldeanu, E., 2008: *Produse forestiere*, Editura Universității Transilvania din Brasov.

4. Beldeanu, E.C., 1999: *Produse forestiere şi studiul lemnului I*. Ed Universității Transilvania, Braşov.

5. Dinulică, F., 2008: *Cercetări privind factorii de influență asupra formării lemnului de compresiune la brad*. Teză de doctorat, Universitatea Transilvania Braşov.

6. Filipovici, J., 1964: *Studiul lemnului*, Vol. I, Ed Didactică şi Pedagogică, Bucureşti.

7. ***, 1997: Amenajamentul U.P. VII Boboştea (O.S. Oradea), I.C.A.S. Oradea

8. ***, 1997: Amenajamentul U.P. VIII Mihiş (O.S. Oradea), I.C.A.S. Oradea

9. ***, 2005: Amenajamentul U.B. I Beliu (O.S. Dumbrava-Arad)

10. ***, 2003: Amenajamentul U.P. V Supur (O.S. Tăşnad), I.C.A.S Oradea

11.***, 1997: Hardwood round timber - Qualitative classification, Part I: Oaks.